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MILK CONSUMPTION BY CHILDREN at school and at home in relation to special milk program

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PREFACE

This study was undertaken to ascertain whether milk that school children consume under the Special Milk Program supplements or replaces milk they would drink without the program. The study is part of a broad program of research designed to expand markets for farm products.

The Special Milk Program, enacted by the 83rd Congress and placed into effect in September 1954, has as its basic purpose the increasing of consumption of whole milk by children in nonprofit schools of high school grade and under. From the outset of the program, a question has been raised whether subsidized milk drunk by children in schools participating in the program supplements or replaces milk consumed at home.

Appreciation is expressed to the many State and local school officials in the Northeast region whose cooperation in permitting and arranging for interviews with school children made this study possible. Special acknowledgment is made to officials of the Food Distribution Division, particularly Samuel C. Vanneman and Philip Hearn, who provided help in obtaining cooperation from State school lunch officials. Leonard Garroway of the Food Distribution Division was particularly helpful in the writing of the report. The data were collected and tabulated and a preliminary report was prepared by Elizabeth A. O'Brien of Stewart, Dougall and Associates, Inc., under contract with the U. S. Department of Agriculture.

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MILK CONSUMPTION BY CHILDREN AT SCHOOL AND AT HOME IN RELATION TO SPECIAL MILK PROGRAM

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SUMMARY

Children in grades 5 through 9, attending schools participating in the Special Milk Program, consumed 7 percent more milk at home and at school during a representative 24-hour period than children attending other schools as shown by the results of a recent survey. Consumption per child attending Special Milk Program schools averaged 25.1 ounces per day compared with 23.4 ounces for the other schools. Children in Special Milk Program schools drank nearly one-third again as much milk while at school as children in schools not participating in the program. Both groups drank about the same amount at home.

The study was undertaken in the Northeast region to measure consumption of beverages, especially whole milk, by children in schools participating in the Special Milk Program compared with consumption by children attending schools having milk services, but not under the Special Milk Program. In each sample group, three-fifths of the schools were operating under the National School Lunch Program..

Almost 29 percent of children attending Special Milk Program schools in the Northeast drank "extra" milk, that is, milk other than that normally served as a part of the plate lunch. Only 16 percent of the children attending schools having a milk service, but not under the Special Milk Program, drank extra milk.

The effect of the Special Milk Program in the grades surveyed appeared to be twofold, that is, increasing the level of intake among regular milk drinkers and increasing the number of milk consumers.

In-school milk consumption was higher in rural areas than in urban and suburban communities, but the quantity consumed away from school was lower in the rural areas. Children in urban areas drank more milk than those in rural areas during the 24-hour period.

The effect of the Special Milk Program on consumption was especially pronounced in low-income areas. In these low-income areas per capita intake of whole milk during the survey period averaged nearly 4 ounces more for children attending Special Milk Program schools than for those attending other schools. The 4-ounce average represented rural and urban areas combined; the difference between low-income urban schools under the Special Milk Program and those not under the program was even larger. The impact of the Special Milk Program was smaller in schools serving medium-income areas. Children in high-income areas drank milk at about the same rate whether or not their schools participated in the Special Milk Program. Also, children from high-income areas attending Special Milk Program schools drank nearly one-fifth

again as much milk, and those attending other schools drank almost half again as much as children from low-income areas.

Boys drank more milk per capita than girls in all age groups. Girls under 12, however, drank more whole milk than girls 12 years old and over. Girls apparently reduce their intake of whole milk as they enter their teens. In contrast, boys in both of these age groups drank whole milk at about the same rate.

OBJECTIVES OF STUDY

The study was designed to measure statistically the difference in consumption of fluid whole milk and other beverages by children attending schools participating in the Special Milk Program as compared with those attending schools having a milk service but not operating under the program. 1/ In addition, the study was designed to appraise the substitution of beverages, especially fluid whole milk, served in school for milk that would otherwise be served at home, in relation to the age and sex of children.

PROCEDURE

To carry out the study, 100 schools in Northeastern States were selected, 50 participating in the Special Milk Program and 50 having a milk service of their own but not the Special Milk Program. The two groups are called program schools and nonprogram schools in this report (the terms refer to the Special Milk Program only, not the National School Lunch Program).

States included in the study were: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, and West Virginia. Vermont, Delaware, and the District of Columbia were omitted, although they are in the area, because they had no eligible nonprogram schools. Whenever possible, Special Milk Program and other schools were paired in the same county in adjacent districts.

Nonprogram schools for the sample were selected at random among the eligible schools in each State. Program schools were selected to match the nonprogram schools as closely as possible in terms of urban-suburban characteristics, economic level of community served by the school, size of enrollment, grades taught, food services available, and participation in the National School Lunch Program. Thirty-one of the schools not participating in the Special Milk Program and thirty of the schools participating were operating under the National School Lunch Program; this balance in the two sample groups tended to equalize the availability and consumption of milk served as part of the meal.

1/ For details concerning the operation of the Special Milk Program in schools and its relationship to the National School Lunch Program see appendix A.

2/ For specific details concerning the sample design, see appendix B.

In the 100 sample schools, pupils in grades 5 through 9 in selected classes were chosen for interviewing to determine their consumption of all beverages, other than water, and selected fruits during a 24-hour period. Interviewers were instructed regarding the number of classes to be sampled in a grade and selection of classes for interviewing. Whenever possible, grades selected for interviewing in Special Milk Program schools were matched with those in nonprogram schools. In conducting the recall interview with children, great effort was exerted to avoid emphasis on milk consumption.

To assist students in recalling beverage consumption in ounces, children were shown actual glasses and bottles most commonly used as well as scale drawings marked to show quantities in ounces. A series of questions covering all parts of a 24-hour period were asked each child in the sample about all beverages consumed other than water. 3/ Upon completion of the interview in each classroom, each schedule was immediately reviewed by the interviewer to ascertain its completeness. From the two sample groups, 8,444 completed questionnaires were obtained, from 4,095 children in program schools and 4,349 in nonprogram ones (table 1).

Milk consumption in school and away from school was recorded separately. To check the quantity of milk consumed as recorded by recall during school hours, an audit was made of milk purchased by children in grades 5 through 9 in each of the sample schools. In schools where all interviewing was completed before the first milk service for the day, an audit of milk purchases was made on the same day. In others, the audit was taken the day following the interview. In conducting the audit, an interviewer was stationed at each location in the school where milk was served, asking each child who took milk his grade level and whether he or she had participated in the interview.

Audit information was obtained by sex and grade of those in sample classes interviewed as well as for those in other classes in the grades included in the study.

FINDINGS

Milk Consumption

A statistically significant difference prevails between the quantity of whole milk consumed in a 24-hour period by children attending schools participating in the Special Milk Program and those attending schools having their own milk service. Flavored whole milk is included as whole milk although this item was relatively unimportant in both Special Milk Program and other schools. Children in program schools drank 25.1 ounces of whole milk per capita per day compared with 23.4 ounces for children in other schools. 4/ This quantity averaged for all pupils in the sample about 3 eight-ounce glasses of whole milk each day. Some of the pupils in the sample did not drink milk, which had the effect of lowering the average.

3/ Appendix C, interviewing schedule.

4/ Based on a test of statistical significance of difference between sample means of per capita consumption of whole milk, there is a probability of 93 out of 100 against accidental occurrence of such a difference.

The higher per capita intake of milk by children attending Special Milk Program schools during the 24-hour period is largely attributable to larger quantities consumed in school. The demand for milk in program schools was undoubtedly stimulated by the relatively low price such schools charged for this item. Prices to children attending schools participating in the Special Milk Program averaged 3.9 cents a half-pint (8 ounces) for whole milk, while prices in schools having their own milk service averaged 7.6 cents. Children in schools participating in the Special Milk Program had an in-school average per capita intake of 5.3 ounces of whole milk compared with 4.1 ounces for children in other schools. The per capita intake of whole milk by children away from school, including that consumed at home, averaged 19.8 ounces for children in program schools and 19.3 ounces in nonprogram schools (table 2).

A higher proportion of children enrolled in schools participating in the Special Milk Program (including schools offering no other food service) drank extra milk, that is, milk other than that normally served as part of a lunch, than children in nonprogram schools. Almost 29 percent of the children in program schools, and only 16 percent in nonprogram schools, had extra milk (table 1).

In program schools, 33 percent of the children indicated they drank milk only away from schcol during the 24-hour period under consideration compared with 40 percent in nonprogram schools (table 3). Almost 9 percent of the children in program schools said they had not consumed any milk in the period covered as contrasted to 12 percent of those in nonprogram schools (table 3). The Special Milk Program has the double-edged effect of increasing consumption among regular milk drinkers and also of increasing the number of milk drinkers in the grades surveyed.

Pupils drinking milk in any school consumed on the average during the 24-hour period slightly over 28 ounces compared with almost 20 ounces for those not drinking milk in school.

Consumption of Other Milk Products

The per capita consumption of milk products, other than whole milk, among children in nonprogram and program schools was about equal (table 2). Milk products include buttermilk, white skim milk, flavored skim milk, cocoa or hot chocolate, and milkshakes or malted milk. In both sample groups, the favorite milk product was cocoa or hot chocolate. Most milk products were consumed away from school, probably in the home.

Total Beverage Consumption

In the same age group within a given population, total intake of beverages per person will in all likelihood be nearly identical, although quantities of individual beverages consumed may vary greatly. The total intake of fluid is basically a physical rather than a social characteristic. This study disclosed no appreciable difference in the total intake of beverages between children attending schools participating in the Special Milk Program and

those attending schools having their own milk service but not under the program. Children attending program schools averaged a total of 45.2 ounces of beverages other than water during a 24-hour period compared with 44.6 ounces by children in nonprogram schools (table 2).

Urbanization and Milk Consumption

In both Special Milk Program and other schools, children residing in urban-suburban areas drank more whole milk per capita than children living in rural areas (table 4). During a 24-hour period, children in urban-suburban areas in both categories of schools consumed about 4 ounces more whole milk per capita than children living in places having less than 2,500 inhabitants. 5/

In-school per capita consumption of whole milk in rural schools, both program and nonprogram, exceeded that for schools serving urban-suburban communities. However, the away-from-school consumption of milk, about 21 ounces, for children attending urban-suburban schools (both program and nonprogram) was substantially higher than the 16 ounces reported for schools in rural areas (table 4).

Economic Level and Milk Consumption

Between program and nonprogram schools in high-average-income areas, there was no statistically significant difference in the per capita intake of whole milk. However, children from high-income areas attending program schools drank nearly one-fifth again as much milk, and those attending other schools drank almost half again as much milk, as children from low-income areas (table 4).

In contrast, a sizable difference prevailed between program and nonprogram schools in areas of low average income. In urban and rural low-income areas, the per capita intake of whole milk during the 24-hour recall period for children attending program schools averaged 23 ounces compared with about 19 ounces in nonprogram schools (table 4). The difference in levels of consumption between low-income urban schools participating in the Special Milk Program and those not under the program was even greater.

In-school consumption of whole milk in program schools in rural low-income areas averaged 5.5 ounces per child, almost double the 2.8 ounces reported for children in schools having their own milk service but not under the program (table 4). The impact of the Special Milk Program on in-school consumption, especially in low-income areas, also has been borne out by other studies. 6/

5/ The difference between sample means in level of consumption of whole milk by children residing in urban-suburban versus rural areas is statistically significant at the 5 percent confidence level. This means there are only 5 chances out of 100 that the numerical values could have been obtained as a result of chance variation.

6/ Anderson, Kenneth E. The Special Milk Program: Its Effect on Consumption in St. Louis and Los Angeles Schools. Mktg. Res. Rpt. No. 209, Agr. Mktg. Serv., U. S. Dept. Agr., January 1958, p. 4.

Consumption of whole milk away from school, presumably in the home, was almost equal between program and nonprogram schools where families were classified as having an annual income of $5,000 or over. In contrast, in areas where families were characterized as having a low annual income, $2,999 and under, the away-from-school consumption per child attending program schools was higher than that in nonprogram ones (table 4). This may suggest that milk-drinking habits developed as a part of the school program have even more pronounced carryover effects in the lower-income areas.

Food Service and Milk Consumption

The same proportion of schools in the two sample groups participated in the National School Lunch Program wherein a half-pint of milk is served with each noonday meal. In schools providing a noonday plate lunch, or both a plate lunch and a la carte items, per capita consumption of milk both in and away from school was larger in Special Milk Program than in nonprogram schools (table 5).

Availability of Soft Drinks and Milk Consumption

Only 14 of the 100 schools surveyed had soft drinks available on school premises; 3 of the 14 participated in the Special Milk Program. The availability of soft drinks on school premises tends to be associated, in both program and nonprogram schools, with lower in-school per capita levels of milk consumption (table 6). Consumption of whole milk away from school also was lower among children attending schools in which soft drinks were available.

Age and Sex of Child and Milk Consumption

Milk-drinking habits of all pupils in the sample by age and sex were analyzed without regard to enrollment in program or nonprogram schools. The children's ages ranged from about 9 to 15 years. There was a significant difference in the intake of whole milk between boys and girls 11 years of age and under; the average consumption rate during a 24-hour period was 27.1 ounces for boys compared with 23 ounces for girls (table 7). 7/ The consumption rates for boys and girls 12 years of age and over were a little lower, but the difference between them was almost identical to that for the younger children (table 8).

Girls 12 years old and over had an average per capita consumption rate of 20.7 ounces, compared with 23 ounces for the younger girls. 8/ In contrast, the per capita intake for boys under 12 years and boys 12 years and over was almost the same. This bears out the often repeated assertion that girls drink less whole milk as they enter the teenage period. However, girls 12 years and

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7/ There was a statistically significant difference between sample means in per capita consumption of whole milk at the 1 percent confidence level.

8/ The difference in sample means in per capita consumption of whole milk between the two age groups was significant at the 1 percent confidence level.

over have a higher but not offsetting intake of malted milk and milkshakes than girls under 12 years old, which might be associated with social aspects of teenage living.

Consumption of Beverages Other than Milk

Beverages other than milk and water made up a larger proportion of the total fluid intake of children in schools not participating in the Special Milk Program than in those participating (table 2). Of the other beverages, soft drinks were the most popular, with 6.8 ounces being consumed in the 24-hour recall period by children attending nonprogram schools and 6.2 by those attending program schools. The highest per capita rate of consumption of soft drinks in both program and nonprogram schools was found among children residing in rural low-income areas.

Orange juice ranked next to soft drinks consumed per child. No significant difference prevailed in the per capita intake of orange juice by children attending program schools compared with nonprogram ones. Children living in urban-suburban areas drank more orange juice than those living in rural communities. Place of residence appeared to have more effect on consumption of orange juice than family income level. Other fruit juices took up a relatively minor part of the total beverage consumption by children.

Tomato juice and other vegetable juices were consumed in small quantities mostly away from school, by the children participating in the survey. The level of consumption of tomato juice and other vegetable juices was about the same between boys and girls and between different age groups.

For the particular age groups of children included in the survey, coffee and tea are not usually considered major beverage items. For the most part, the drinking of these two items took place away from school, with a slightly heavier intake by children attending Special Milk Program schools as compared with those attending nonprogram schools. Also the consumption of coffee and tea tended to be higher among children in low-income areas.

Consumption of Fresh Fruit

Along with obtaining information on beverage consumption, the quantities of fresh fruit eaten out of hand also were determined. About 38 percent of the children in the sample ate apples, 27 percent reported eating oranges and 30 percent, bananas. Pears were for the most part out of season at the time of the survey and only about 5 percent of the children said they ate pears during the 24-hour recall period. Fruit was included in the questionnaire primarily to deemphasize the beverages, especially whole milk.

Table 1.--Number of children interviewed and extra milk purchased by children in grades 5 to 9, in 50 schools participating and 50 schools not participating in the Special Milk Program, Northeastern States, 24-hour period in spring 1959 1/

Item	Schools under Special Milk Program						Nonprogram schools with own milk service					
	Schools	Children interviewed 2/	Children who purchased extra milk		Quantity of extra milk purchased		Schools	Children interviewed 2/	Children who purchased extra milk		Quantity of extra milk purchased	
					Total	Per pupil					Total	Per pupil
	Number	Number	Number	Percent	Ounces	Ounces	Number	Number	Number	Percent	Ounces	Ounces
Total	50	4,095	1,169	28.5	10,546	2.58	50	4,349	716	16.5	6,273	1.44
Urbanization: 3/												
Urban-suburban	33	2,813	840	29.9	7,615	2.71	30	2,772	538	19.4	4,795	1.73
Rural	17	1,282	329	25.7	2,931	2.29	20	1,577	178	11.3	1,478	.94
Income group and urbanization: 4/												
High income	16	1,172	399	34.0	3,627	3.09	17	1,175	219	18.6	1,904	1.62
Urban-suburban	11	872	284	32.6	2,643	3.03	14	1,012	205	20.3	1,800	1.78
Rural	5	300	115	38.3	984	3.28	3	163	14	8.6	104	.64
Medium income	26	2,394	624	26.1	5,528	2.31	27	2,491	386	15.5	3,431	1.38
Urban-suburban	18	1,718	496	28.9	4,388	2.55	13	1,345	236	17.5	2,205	1.64
Rural	8	676	128	18.9	1,140	1.69	14	1,146	150	13.1	1,226	1.07
Low income	8	529	146	27.6	1,391	2.63	6	683	111	16.3	938	1.37
Urban-suburban	4	223	60	26.9	584	2.62	3	415	97	23.4	790	1.90
Rural	4	306	86	28.1	807	2.64	3	268	14	5.2	148	.55
Type of lunch service:												
Plate lunch with milk	33	2,528	666	26.3	6,216	2.46	32	2,449	313	12.8	2,556	1.04
Plate lunch and a la carte with milk	4	358	91	25.4	762	2.12	2	152	38	25.0	338	2.22
A la carte only with milk	1	84	28	33.3	240	2.86	5	793	254	32.0	2,434	3.07
Milk service only	12	1,125	384	34.1	3,328	2.96	11	955	111	11.6	945	.99
Availability of soft drinks on school premises:												
Available	3	249	36	14.5	352	1.41	11	1,203	220	18.3	2,096	1.74
Not available	47	3,846	1,133	29.5	10,194	2.65	39	3,146	496	15.8	4,177	1.32

1/ Extra milk is defined as that milk purchased in addition to milk served with the plate lunch and includes each unit of milk served in schools with no other food service.

2/ As only selected classes within schools having grades 5 through 9 were included in the sample, total attendance in the grades surveyed exceeded the number of pupils interviewed.

3/ Suburban area is defined as one within commuting distance of a city with a population of 50,000 or more and with many residents employed in the city; an urban community as one with 2,500 or more but not fitting the suburban definition; and a rural area as a place of fewer than 2,500 inhabitants.

4/ Annual family incomes of $2,999 and under are designated as low; $3,000 to $4,999 as medium; and $5,000 and over as high.

Table 2.--Whole milk, milk products, and other beverages (not water) consumed in school and away from school by children in grades 5 through 9 in 50 schools participating and 50 schools not participating in the Special Milk Program, Northeastern States, 24-hour period in spring 1959

Beverage item	Schools under Special Milk Program						Nonprogram schools with own milk service					
	In school		Away from school		Total		In school		Away from school		Total	
	Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita
	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces
Total all beverages 1/	24,936	6.09	160,230	39.13	185,166	45.22	24,196	5.56	169,593	39.00	193,789	44.56
Whole milk:												
White whole milk	19,337	4.72	73,738	18.01	93,075	22.73	16,629	3.82	77,083	17.72	93,712	21.55
Flavored whole milk	2,450	.60	7,302	1.78	9,752	2.38	1,263	.29	6,973	1.60	8,236	1.89
Total whole milk	21,787	5.32	81,040	19.79	102,827	25.11	17,892	4.11	84,056	19.33	101,948	23.44
Milk products:												
Buttermilk	4	--	691	.17	695	.17	22	--	1,156	.26	1,178	.27
White skim milk	98	.02	2,816	.69	2,914	.71	85	.02	4,424	1.02	4,509	1.04
Flavored skim milk	86	.02	407	.10	493	.12	--	--	414	.09	414	.09
Cocoa or hot chocolate	145	.04	7,705	1.88	7,850	1.92	150	.03	7,351	1.69	7,501	1.72
Milkshake or malted milk	34	.01	3,173	.77	3,207	.78	165	.04	3,991	.92	4,156	.96
Total milk products	367	.09	14,792	3.61	15,159	3.70	422	.09	17,336	3.98	17,758	4.08
Other beverages:												
Orange juice	829	.20	14,722	3.60	15,551	3.80	392	.09	15,767	3.62	16,159	3.72
Other fruit juices	249	.06	6,543	1.60	6,792	1.66	1,209	.28	8,277	1.90	9,486	2.18
Tomato juice	90	.02	3,304	.81	3,394	.83	113	.03	3,671	.84	3,784	.87
Other vegetable juices	80	.02	965	.24	1,045	.26	30	.01	858	.20	888	.20
Soft drinks	1,080	.26	24,274	5.93	25,354	6.19	3,216	.74	26,267	6.04	29,483	6.78
Tea	158	.04	7,251	1.77	7,409	1.81	638	.15	6,286	1.44	6,924	1.59
Coffee	296	.07	7,339	1.79	7,635	1.86	284	.06	7,075	1.63	7,359	1.69
Total other beverages	2,782	.68	64,398	15.73	67,180	16.41	5,882	1.35	68,201	15.68	74,083	17.03

1/ Because of rounding, averages do not always add to totals shown.

Table 3.--Children who drank milk at school compared with those who did not, grades 5 to 9 in 50 schools participating and 50 schools not participating in Special Milk Program, Northeastern States, 24-hour period in spring 1959

Item	All schools		Schools under Special Milk Program		Nonprogram schools with own milk service	
	Children	Percent	Children	Percent	Children	Percent
Total interviewed	8,444	100.0	4,095	100.0	4,349	100.0
Drank milk at school	4,446	52.7	2,391	58.4	2,055	47.3
Lunch milk only	2,561	30.4	1,222	29.8	1,339	30.8
Extra milk	1,885	22.3	1,169	28.6	716	16.5
Drank no milk at school	3,998	47.3	1,704	41.6	2,294	52.7
Drank milk away from school only	3,112	36.8	1,356	33.1	1,756	40.4
Drank no milk	886	10.5	348	8.5	538	12.3

Table 4.--Per capita consumption of whole milk in school and away from school by children in grades 5 to 9, in 50 schools participating and 50 schools not participating in Special Milk Program, by urbanization and income group, Northeastern States, 24-hour period in spring 1959 1/

Item	Schools under Special Milk Program			Nonprogram schools with own milk service		
	In school	Away from school	Total	In school	Away from school	Total
	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces
Urbanization: 2/						
Urban-suburban	5.08	21.34	26.42	3.72	20.99	24.71
Rural	5.85	16.39	22.24	4.80	16.42	21.22
Income group and urbanization: 2/						
High income	6.04	21.17	27.21	5.76	21.90	27.66
Urban-suburban	5.72	22.54	28.27	5.53	23.11	28.64
Rural	6.96	17.17	24.13	7.25	14.36	21.61
Medium income	5.06	19.49	24.55	3.67	18.97	22.64
Urban-suburban	4.88	20.54	25.42	2.62	20.37	22.99
Rural	5.52	16.83	22.34	4.91	17.32	22.23
Low income	4.90	18.09	22.99	2.87	16.24	19.11
Urban-suburban	4.05	22.83	26.89	2.89	17.81	20.70
Rural	5.50	14.64	20.15	2.85	13.80	16.65

1/ Extra milk is defined as that milk purchased in addition to milk served with the plate lunch and includes each unit of milk served in schools with no other food service.

2/ Suburban area is defined as one within commuting distance of a city with a population of 50,000 or more and with many residents employed in the city; an urban community as one with 2,500 or more but not fitting the suburban definition; and a rural area as a place of fewer than 2,500 inhabitants.

Table 5.--Per capita consumption of whole milk in school and away from school by children in grades 5 through 9, in 50 schools participating and 50 schools not participating in the Special Milk Program, by type of food service, Northeastern States, 24-hour period in spring 1959

Food service at school	Schools under Special Milk Program			Nonprogram schools with own milk service		
	In school	Away from school	Total	In school	Away from school	Total
	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces
Plate lunch with milk	6.18	20.15	26.32	5.56	18.06	23.62
Plate lunch and a la carte with milk	7.27	17.26	24.53	5.78	14.50	20.28
A la carte lunch with milk	2.86	21.77	24.63	3.07	18.56	21.63

Table 6.--Per capita consumption of whole milk in school and away from school by children in grades 5 through 9, in 50 schools participating and 50 schools not participating in the Special Milk Program, by availability of of soft drinks on premises, Northeastern States, 24-hour period in spring 1959

Availability of soft drinks 1/	Schools under Special Milk Program			Nonprogram schools with own milk service		
	In school	Away from school	Total	In school	Away from school	Total
	Ounces	Ounces	Ounces	Ounces	Ounces	Ounces
Available on school premises	3.48	14.69	18.17	3.54	17.05	20.61
Not available on school premises	5.43	20.12	25.56	4.33	20.20	24.52

1/ Only 14 schools in the total sample of 100 had soft drinks available; 3 of the 14 participated in the Special Milk Program.

Table 7.--Per capita consumption of milk, milk products, and other selected beverages during a 24-hour period by boys and girls 11 years old and under enrolled in public schools, in grades 5 through 9, Northeastern States in spring 1959

Beverage item	Boys 11 years old and under			Girls 11 years old and under		
	Boys reporting	Consumption		Girls reporting	Consumption	
		Per boy reporting	Per boy in sample schools		Per girl reporting	Per girl in sample schools
	Number	Ounces	Ounces	Number	Ounces	Ounces
White whole milk	1,338	27.52	24.85	1,438	22.99	20.82
Flavored whole milk	275	12.08	2.24	279	12.23	2.15
Total whole milk	1,613	39.60	27.09	1,717	35.22	22.97
Buttermilk	27	10.52	.19	20	8.70	.11
White skim milk	45	20.89	.63	92	18.83	1.09
Flavored skim milk	16	12.19	.13	21	8.28	.11
Cocoa or hot chocolate	215	10.24	1.48	289	9.71	1.77
Milk shake or malted milk	83	12.84	.72	59	10.73	.40
Total other milk products	386	66.68	3.15	481	56.25	3.48
Orange juice	622	8.82	3.70	738	8.19	3.80
Other fruit juices	308	8.65	1.80	332	8.35	1.75
Tomato juice	142	7.31	.70	175	7.75	.85
Other vegetable juices	45	8.60	.26	43	5.88	.16
Soft drinks	559	13.16	4.97	605	10.80	4.11
Tea	199	9.92	1.33	215	8.92	1.21
Coffee	189	8.58	1.09	163	7.45	.76
Total other beverages	2,064	65.04	13.85	2,271	57.34	12.64

Table 8.--Per capita consumption of milk, milk products, and other selected beverages during a 24-hour period by boys and girls 12 years old and over enrolled in public schools, in grades 5 through 9, Northeastern States in spring 1959

Beverage item	Boys 12 years old and over			Girls 12 years old and over		
	Boys reporting	Consumption		Girls reporting	Consumption	
		Per boy reporting	Per boy in sample schools		Per girl reporting	Per girl in sample schools
	Number	Ounces	Ounces	Number	Ounces	Ounces
White whole milk	2,337	28.87	24.47	2,161	22.88	18.89
Flavored whole milk	482	13.37	2.34	420	11.46	1.84
Total whole milk	2,819	42.24	26.81	2,581	34.34	20.73
Buttermilk	72	14.03	.37	47	8.62	.15
White skim milk	113	22.19	.91	128	17.52	.86
Flavored skim milk	24	10.46	.09	28	10.25	.11
Cocoa or hot chocolate	464	11.57	1.95	503	9.90	1.90
Milk shake or malted milk	229	15.87	1.32	162	12.53	.78
Total other milk products	902	74.12	4.64	868	58.82	3.80
Orange juice	1,078	9.70	3.79	1,130	8.61	3.72
Other fruit juices	549	10.01	1.99	623	8.58	2.04
Tomato juice	301	8.22	.90	328	7.03	.88
Other vegetable juices	94	8.45	.29	58	8.60	.19
Soft drinks	1,413	16.46	8.43	1,299	13.62	6.76
Tea	518	10.69	2.00	506	9.69	1.87
Coffee	641	12.05	2.80	462	9.59	1.69
Total other beverages	4,594	75.58	20.20	4,406	65.72	17.15

APPENDIX A

Operation of the Special Milk Program in Schools and Its Relationship to the National School Lunch Program

Since 1954, the U. S. Department of Agriculture has administered the Special Milk Program. To increase milk consumption, the Department established a system of reimbursement or incentive payments for each half-pint of milk consumed other than with a Type A Lunch provided under the National School Lunch Program. These payments made it possible for schools to inaugurate or to expand milk service by enabling them to offer milk at reduced prices.

The maximum rate of reimbursement for milk sold to children is generally 3 cents per half pint. However, schools that also participate in the National School Lunch Program may receive a maximum of 4 cents per half-pint, exclusive of the first half-pint of milk served as part of the Type A Lunch.

Within the maximum rates established by the Department of Agriculture, the amount of reimbursement actually provided will depend upon the cost of milk to the school, the proposed selling price to children, and the cost of handling milk within the school. Such handling costs generally do not exceed 1 cent per half-pint.

APPENDIX B

Sample Selection and Design

A major undertaking in this research project was the building of the universe of schools from which the sample could be drawn. The first step was to obtain cooperation from commissioners of education, directors of education, superintendents, and others in the various States in the region selected for study.

It was determined at the outset that grades 5 through 9 in 100 schools, 50 participating in the Special Milk Program and 50 having their own milk service but not in the program, would be studied.

Counties were stratified by types within the individual States, on the following basis: (1) M 1--Metropolitan counties containing a city of 500,000 population or more, (2) M 2--other metropolitan counties, (3) U--other counties with more than 50 percent urban population, and (4) R--all other counties. The M 1 stratum was sampled at 100 percent with 10 counties. In the other three strata, 20 percent of the counties were selected at random proportionately by States, as potential sample counties. A potential sample county was one wherein information could be obtained for drawing a sample of eligible schools having their own milk service by probability methods and the availability of Special Milk Program schools for matching.

Based on data available as to the number of eligible nonprogram schools (control) prevailing in the potential sample counties which had been selected proportionately by States, a preliminary distribution of nonprogram schools

was computed. Nonprogram schools (control) were particularly numerous in West Virginia, so the number assigned to that State was arbitrarily lowered. Within the framework of the sample of eligible nonprogram schools, very small ones (those having less than 30 pupils enrolled in grades 5 through 9) were eliminated because of difficulty likely to be encountered in grade separation and administration. In the sample selection of nonprogram schools, an alternate one also was chosen whenever possible to insure against the possibility of noncooperation or other reasons that might preclude use of the school originally selected.

Schools participating in the Special Milk Program (experimental) were selected to match nonprogram schools (control) as closely as possible, so as to have a balanced sample group in terms of all social and economic factors. Alternates were chosen for these schools also.

Extreme care was exercised to obtain schools so that the total sample would provide a good distribution of grade levels. In each sample county within a State, the grades actually present in nonprogram schools were assigned for sampling in proportion to their actual presence. The grade sampling in program schools was made to match that of nonprogram ones whenever possible on a school-by-school basis.

Interviewers were provided with instructions for the selection of classes within grades having more than one class. However, application of the instruction was difficult, since most school principals reserved the right to select the class or classes to be interviewed.

In analyzing the statistical significance of sample means between program and nonprogram schools, computation of variances was in each instance based on the number of schools in question. Since the school was the major sampling unit and all stratification was carried out at the school level, variation between schools within strata is a valid criterion for testing the hypothesis regarding the effect of the Special Milk Program on milk consumption by children. The significance test applied was to determine whether the consumption of milk was significantly higher in program than in nonprogram schools, rather than testing merely for significant differences between the two groups of schools, regardless of direction.

APPENDIX C

Interviewing Schedule

The form reproduced on the following two pages shows the questions that were answered by children in the survey.

STEWART, DOUGALL & ASSOCIATES, INC.
405 Park Avenue
New York 22, New York

#2912
Budget Bureau No. 40-5907.1
Approval expires June 30, 1959

CONSUMPTION OF MILK, OTHER BEVERAGES AND FRUIT BY SCHOOL CHILDREN

1–

2–

Name ..... Grade 3–

School 4–

City ..... State ..... Date 5–

1. How many children under 20 years old are there who live at home? (Don't forget to count yourself.)

..... 6–

2. a. How old are you? 7–

b. Are you a boy or a girl? . . . . . Boy ☐ Girl ☐

3. Were you in school yesterday? . . . . . Yes ☐ No ☐

MILK AND MILK PRODUCTS

People drink several kinds of milk. We have listed some of these kinds below. Will you please tell us how much of each kind you drank at each of the times we ask about. Look at the glasses on the desk and at the drawings that have been passed out to you, and write your answer in ounces. If you did not drink any, please give "—" as an answer. Do not leave any question unanswered unless you have been asked to skip the question.

First, please think about what you had when you were in school yesterday. Each milk container served in your school holds _____ ounces.

IN SCHOOL

	White Whole Milk	Flavored Whole Milk	Butter-milk	White Skim Milk	Flavored Skim Milk	Cocoa or Hot Chocolate	Milk Shake or Malted Milk
1. After you came to school yesterday morning, how much of each of these did you drink before lunch?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
2. If you ate the school lunch, did you have any milk that was included with that _____ cents lunch?	Yes____ No ____	Yes____ No ____	Yes____ No ____	Yes____ No ____	Yes____ No ____	Yes____ No ____	Yes____ No ____
3. If you had milk with the school lunch, how much milk did you drink that was included with this _____ cents lunch?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
4. How much of each of these kinds of milk did you buy at lunch in school that was not included in your _____ cents school lunch?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
5. If you brought milk from home to drink with your lunch, how much did you drink?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
6. After lunchtime yesterday, how much of each of these kinds of milk did you drink at school? . .	oz.	oz.	oz.	oz.	oz.	oz.	oz.
	19– 20– 21– 22–	23– 24– 25– 26–	27– 28–	29– 30–	31– 32–	33– 34–	35– 36–

PLEASE DO NOT WRITE BELOW THIS LINE

Rotation order: M ☐ 17–1 J ☐ –2 F ☐ –3

Interviewing time: A.M. ☐ 18–1 P.M. ☐ –2

Interviewer's Name _____

NOT IN SCHOOL

Now, think about what you drank when you were not in school.

	White Whole Milk	Flavored Whole Milk	Butter-milk	White Skim Milk	Flavored Skim Milk	Cocoa or Hot Chocolate	Milk Shake or Malted Milk
1. If you did not eat your lunch at school yesterday, how much of each of these did you drink with your lunch?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
2. After you left school yesterday, and before you had your evening meal, how much of each of these did you drink?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
3. How much of each of these did drink with your evening meal?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
4. After your evening meal yesterday, before you went to bed, how much of each of these did you drink?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
5. This morning before you came to school how much of each of these did you drink?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
	37– 38–	39– 40–	41– 42–	43– 44–	45– 46–	47– 48–	49– 50–

JUICES AND OTHER BEVERAGES THAN MILK

Here is a list of some juices and other drinks people often have with meals or between meals. Please look carefully at the glasses, and at the drawings of glasses and bottles, and put down, as nearly as you can, the number of ounces of each of these that you drank at each of the times asked about. If you did not have any, write "—". A tea or coffee cup is usually 6 ounces.

	Orange Juice	Other Fruit Juices	Tomato Juice	Other Vegetable Juices	Soft Drinks	Tea	Coffee
1. Yesterday, while at school either at lunchtime, or in the morning or afternoon, how much of each of these did you drink?	oz. 51– 52–	oz. 53– 54–	oz. 55– 56–	oz. 57– 58–	oz. 59– 60–	oz. 61– 62–	oz. 63– 64–
2. If you did not eat lunch at school yesterday, how much of each of these did you drink at lunch?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
3. After you left school yesterday, and before you had your evening meal, how much of each of these did you drink?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
4. How much of each of these did you drink with your evening meal?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
5. After your evening meal yesterday, before you went to bed, how much of each of these did you drink?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
6. This morning before you came to school, how much of each of these did you drink?	oz.	oz.	oz.	oz.	oz.	oz.	oz.
	65– 66–	67– 68–	69– 70–	71– 72–	73– 74–	75– 76–	77– 78–

FRESH FRUIT

1. At any time yesterday, either in school or out of school, did you eat any of these fruits?

An apple . . . . . Yes ☐ No ☐ If "Yes," How many? 8–

An orange . . . . . Yes ☐ No ☐ If "Yes," How many? .....

A banana . . . . . Yes ☐ No ☐ If "Yes," How many? 9–

A fresh pear . . . . . Yes ☐ No ☐ If "Yes," How many? .....

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